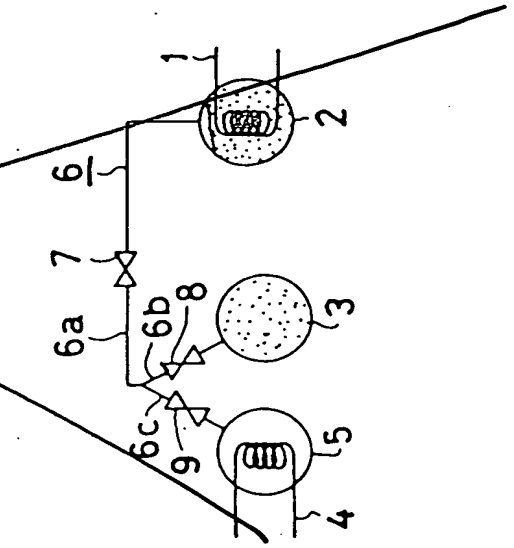
(54) CHEMICAL HEAT STORAGE METHOD
(11) 58-145887 (A) (43) 31.8.1983 (19) JP
(21) Appl. No. 57-28278 (22) 23.2.1982
(71) HITACHI ZOSEN K.K. (72) TSUTOMU NAKAMURA(1)
(51) Int. Cl³. F28D17/00,F28F23/00//F25B17/08

PURPOSE: To enable to increase the heat storage capacity by a method wherein $Na_2S \cdot nH_2O$, which is employed as a heat storage element for solar heat or the like, is turned into Na_2S by heating and at the same time the steam generated in this case is adsorbed by adsorbent and the heat of hydration, which is generated by reversing the above-mentioned reaction, is utilized at the time of heat release.

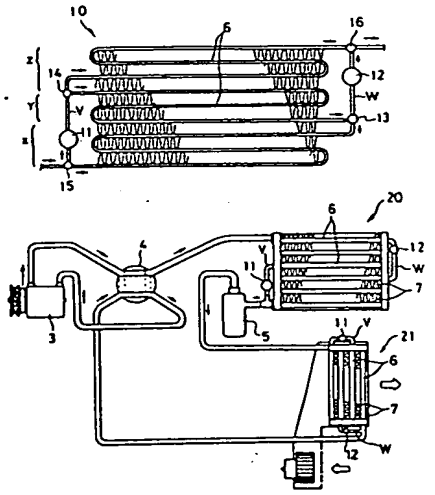
CONSTITUTION: In order to store heat, valves 7 and 8 are open and a valve 9 is closed and $Na_2S \cdot nH_2O$ is heated by the heat transfer medium, which is heated by solar heat or the like and then introduced into a reactor 2 by means of a conduit 1. At this time, $Na_2S \cdot nH_2O$ is turned into Na_2S by generating steam, which is adsorbed by adsorbent such as silica gel or the like at an adsorber 3. After the reaction is completed, the valves 7 and 8 are closed in order to store heat. On the other hand, in order to release heat, while the valve 8 being kept in closed state, the valves 7 and 9 are open so as to let Na_2S in the reactor 2 adsorb the steam produced at an evaporator 5 in order to produce the heat of hydration, which is generated by reversing the above-mentioned reaction. Said heat is taken out through the heat transfer medium conduit. In such a manner as mentioned above, no heat source for condensation of steam is necessary and high capacity heat storage is made possible even at room temperature and the heating element is made endurable for unlimited times of cycles and its characteristics remain unchanged.



(54) HEAT EXCHANGER
(11) 58-145889 (A) (43) 31.8.1983 (19) JP
(21) Appl. No. 57-29190 (22) 25.2.1982
(71) NISSAN JIDOSHA K.K.(1) (72) MIKIO YANO(3)
(51) Int. Cl³. F28D21/00,F01P3/20

PURPOSE: To enable to form the optimum flow passage in conformation to operating conditions by a structure wherein a plurality of passages for heat-exchanging are connected in series and by-pass passages are provided between the respective inlet sides and the connection parts and between the respective outlet sides and the connection parts of said passages so as to be able to connect in series and in parallel by means of switching valves in an automotive use air conditioning equipment or the like.

CONSTITUTION: During cooler cycle, a change-over valve 4 is set so as to circulates discharged coolant from a condenser 20 to an evaporator 21. At this time, the switching valves 11 and 12 of the condenser 20 are closed so as to form a series passage in the condenser 20, while the switching valves 11 and 12 of the evaporator 21 are open so as to form a plurality of parallel passages in the evaporator 21. On the other hand, during heat pump cycle, the delivered coolant is circulated in reverse direction to that mentioned above by changing-over the change-over valve 4, resulting in exchanging the functions of the condenser 20 and the evaporator 21. At the same time, the switching valves 11 and 12 of the condenser 20 are open so as to form a plurality of parallel passages in the condenser 20, while the switching valves 11 and 12 of the evaporator 21 are closed so as to form a series passage in the evaporator 21. Accordingly, because the passages can be changed in conformation to operating conditions, icing and frosting can be prevented and efficient operation is enabled.



(54) GROOVED HEAT PIPE
(11) 58-145890 (A) (43) 31.8.1983 (19) JP
(21) Appl. No. 57-25934 (22) 22.2.1982
(71) TOKYO SHIBAURA DENKI K.K. (72) YUKIO SHIKADA(2)
(51) Int. Cl³. F28F1/40

PURPOSE: To enable to enhance the heat transfer rate by a structure wherein longitudinal groove group sections and no-groove sections, which are located lower than the bottom of the groove in depth, and longitudinally and alternately provided on the internal wall surface of the heat pipe and the boundary surfaces of the two sections are made to be perpendicular to the surface of the tube, in a heat exchanger employed at ocean thermal difference power generation or the like.

CONSTITUTION: The groove group section 1, the depth of groove of which is 0.2~0.5mm and the pitch between the grooves of which is 0.8~3mm for example, is formed over the surface of titanium sheet blank by rolling with grooved rolls. After that, no-groove sections 2 are formed by removing metal with grinding work so as to realize the length of the groove group section 1 to be 25~100mm, the width of the no-groove section 2 to be 2~5mm and the depth of the no-groove section 2 to be lower than the bottom of the groove by 0.1~0.2mm and yet the boundary surface 3 of the two sections to be perpendicular to the surface of the tube. The heat pipe made with the surface as mentioned above have an improved heat transfer rate due to the groove group sections 1 without much pressure loss and an heat transfer surface area increased by about 5~15% as compared with that of a smooth pipe. In addition, because turbulent flow is promoted at the boundary surfaces 3 of the groove group section 1 and the no-groove section 2, the heat transfer rate is improved.